STATE OF MONTANA
MONTANA DEPARTMENT OF TRANSPORTATION
JOB PROFILE

☐ Conversion from PD format
☐ Update
X Informal Review
☐ Formal Review

Date Submitted _____

SECTION I - Identification

Working Title: **Senior Traffic Safety Engineer**

Department: Transportation

Job Code Number: 172517

Division & Bureau: Engineering/ Traffic & Safety

Job Code Title: Civil Engineer

Section: Safety Management

Pay Band: **7**

Work Address:
2701 Prospect Avenue
Helena, MT 59620-1001

Position Number: 08004

Phone: 444-7218

☐ FLSA Exempt x FLSA Non-Exempt

x Non-Union ☐ MPEA ☐ Blue Collar

Profile Completed By: Pierre Jomini/ Bill Crivello

Work Phone: 444-6113

Work Unit Mission Statement or Functional Description:

The mission of the Safety Management Section is to reduce the severity and number of traffic crashes.

The Safety Management Section is responsible for the Highway Safety Improvement Program and the High Risk Rural Roads Programs, established by Congress under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. For these programs, the Safety Management staff maintains, coordinates and uses a variety of data bases from the street index, road log, traffic volume tables to accident data files. It identifies and analyzes high crash locations. Following crash causation determinations, staff evaluates feasible countermeasures to identified crash trends. It develops conceptual and pre-design plans, ranks projects on the basis of benefit/cost calculations and establishes a yearly list of safety improvements. Staff designs projects implemented by maintenance forces and

evaluates completed projects. Staff writes a yearly program summary, mandated by the Federal Highway Administration.

The Safety Management staff performs safety reviews for roadway projects, design exceptions, bridge projects, planning projects and other Departments' needs. It identifies crash trends, significant variances from statewide crash trends, documents crash clusters and recommends safety measures, commensurate with the scope of the project.
The Safety Management staff coordinates documents and administers corridor safety audits, a multi-disciplinary team approach to analyze roadway corridors and make recommendations for safety and traffic operation improvements. The staff provides support for the Comprehensive Highway Safety Plan. Staff provides crash analyses in construction zones and participates in the Work Zone Safety Committee and chairs the liaison meetings between the Montana Highway Patrol, the Federal Highway Administration and the Department of Transportation.

The Safety Management staff reviews documents, reports and provides accident data and safety information to numerous customers from public requests, reporters to consultants. Staff participates in research projects, provides safety data, analysis and expertise.

Describe the Job's Overall Purpose:

The overall purpose of this position is to reduce the severity and number of traffic accidents through the development of the Highway Safety Improvement Program.

SECTION II - Major Duties or Responsibilities ***% of Time***

The duties and responsibilities of this position consist primarily in the development of the Highway Safety Improvement Program, the management and coordination of data bases and computer programs.

60% PROGRAM MANAGEMENT AND DEVELOPMENT

Utilizing data and information from multiple data bases (Highway Patrol, Montana Department of Transportation (MDT) Planning Division, Information Services Bureau), analyze crash and incident information in order to identify critical sites and corridors that indicate a need for safety review. Information and data are evaluated for severity, frequency and crash rate implications.

After compiling, reviewing and analyzing crash site and corridor data, identify crash clusters or critical corridors for further engineering analyses and research. This step requires analysis of sites in relation to other programmed roadway projects, past safety reviews and implemented safety projects.

Directs and supervises technical design personnel to develop graphic collision diagrams and compilation of required data and information, which is pertinent and necessary for completion of each specific on-site field investigation/review. Required diagrams, plans, reports will be determined through analysis of data, information as well as engineering principles relating to road design, traffic engineering and other disciplines as needed.

Organizes, plans and conducts on-site investigations/analyses in order to evaluate the causes of crashes and circumstances contributing to collisions, crashes and accompanying trends. On-site analysis requires consideration of multiple factors and site characteristics, including but not limited to roadway characteristics, topography, terrain, signage, pavement markings, traffic control devices, roadway and shoulder widths, grades, super-elevation in curves, in-slopes, traffic volumes, traffic mix, speeds, types of vehicles involved, etc… Based upon the site or corridor, will request direct involvement of District and FHWA engineering and construction personnel. On-site analysis requires broad and comprehensive knowledge and expertise regarding the principles and application of civil engineering, highway and traffic engineering, human factors in transportation, Intelligent Transportation Systems (ITS), current research and technology as it relates to highway safety improvements.

Complete a preliminary/conceptual engineering design and benefit/cost analysis to develop annually a list of recommended sites and corridors with individualized safety improvement and enhancement recommendations for administrative review and action by the Transportation Commission. Using knowledge and expertise of civil engineering and highway/traffic safety design, analyze information and data, review and consider established State and federal minimum design standards and formulate proposed alternatives for consideration based upon analysis of all variables: i.e. minimum standards, costs, impacts of different alternatives, environmental and right-of-way considerations, implications for human factors (saved lives and injuries).

Provide technical supervision, training and mentoring for civil engineering specialists and design technicians through ongoing analysis and problem solving efforts throughout the course of individual crash/collision reviews in order to identify causation issues, trends and countermeasures.

As technical expert for traffic safety engineering, maintain knowledge and familiarity of current and developing technologies for safety engineering, including software programs, new equipment designed for optimal safety effectiveness as well as cost efficiency. Requires research, analysis and trial utilization of new technologies and recommendations for new processes and protocols for the Montana Department of Transportation (MDT).

Develops annually a follow-up analysis and evaluation program for select safety improvement measures recommended and implemented, in conformance with MDT and Federal Highway Administration (FHWA) requirements and regulations. For projects which result in significant benefits develop proposals for continued project development or changes in practice.

20% HIGHWAY SAFETY EXPERT EVALUATION

Performs safety reviews for roadway projects, design exceptions, planning programs and other departmental needs. Identifies significant variations from statewide crash trends, documents crash clusters. Using engineering expertise in highway safety, roadway design, traffic engineering recommends safety enhancements. These safety reviews assist design

engineers in incorporating safety features in their projects. Provides expert opinion on corridor safety audits and recommends safety improvements

15% EXPERT TECHNICAL ASSISTANCE

Makes presentations at public meetings, citizen group meetings and conferences. Communicates regularly in writing and verbally with other bureaus, District staff, other agencies, Tribal representatives and local officials about safety analyses, safety projects and technical matters. Attends meetings and represents the Safety Management Section at field reviews, scoping meetings, plan-in-hand and committee meetings, giving safety recommendations based on safety engineering expertise and knowledge of the other highway and traffic engineering fields. Participates on research committees by reviewing literature, contacting other agencies, analyzing data and crashes, using safety engineering expertise to make recommendations. Collaborates in the development and evaluation of special studies, experimental and demonstration projects for safety enhancements. Compiles data, reviews and evaluates safety research and statistics for applications in Montana. Participates on ad-hoc committees on topics such as route naming, corridor identification, infrastructure and roadway attributes inventories, crash codes, as these issues impact the Department's work.

5% DATA BASE MANAGEMENT

Utilizing data from cities and Highway Patrol personnel, develop and maintain a specific data base of link/node of city streets indexing data regarding locations and accidents for all incorporated cities in Montana. The data base is then used by traffic safety engineering specialists by merging location specific queries and accident clusters to ascertain unique or problematic trends, issues, etc…relating to efforts to identify or target sites and corridors in need of investigation or analysis. Appropriate queries require specific knowledge and expertise relating to highway and roadway accidents, collisions and incidents which may indicate a need for analysis.

Recognize and reconcile data and informational errors pertaining to data provided by outside sources for inclusion in the data base and MDT's geographical information system.

2. Specific examples of problems solved, decisions made, or procedures followed when performing the most frequent duties of this position include:

Identified concentration of single vehicle running off the road accidents. Reviewed not only the roadway geometry but also the traffic control devices, the side slope, the environmental conditions, the severity of the crashes , driver attributes, types of vehicles involved, etc… Must evaluate the potential countermeasures: larger traffic signs to improve target value, increase the signing for example by installing chevrons to better delineate the curve, install a flasher with the curve warning sign, shoulder widening to increase the recovery area , slope flattening to provide a traversable slope thus reducing the severity of the crashes, remove roadside obstacles, install shoulder rumble strips to alert the drivers that they are leaving the traveled way. All these alternatives must be weighed in relation to the overall characteristics of the roadway, the economics of the proposed countermeasure (calculations of benefits and costs), the statewide implications and the potential impacts on other adjacent sites. Must use highway safety expertise and engineering judgment, as each site has its own characteristics. The

decision must meet the Manual on Uniform traffic Control Devices, Roadway Design Manual, Traffic Engineering Manual, but may go beyond minimum criteria or may involve new technology, intelligent transportation system or experimental devices. Recent examples of innovative decisions: installation of shoulder rumble strips, experimental anti-icing spray system on a bridge, proposed speed detection tied to a warning sign to let truckers know that they are driving too fast. Occasionally non-engineering solutions are recommended such as work with enforcement, health or education. When a trend a bicycle –vehicle crash trend was identified involving teen agers, the engineer worked with enforcement and education agencies to promote bicycle safety.

The crash concentration may involve a huge variety of trends from collisions between a thru vehicle and left turning vehicles, concentration of truck crashes, collisions between animals and vehicles, pedestrian-vehicle collisions, crashes with icy conditions, crashes occurring at night, etc… The decisions made involve road reconstruction, construction of left turn lanes, electrical installation such as flashers, lighting, traffic signal, drainage improvement, signing, pavement markings, obstacle removal, slope flattening, while weighing potential economic, environmental societal impacts.

3. The most complicated aspect of this position is:

Select the most cost effective countermeasure for each site to best address the crash trend, improve the safety of the site or corridor. The diversity of possible improvements in relation to the limited funding available necessitates a broad knowledge and extensive safety engineering expertise.

4. Guidelines, manuals, or written procedures that support this position include:

Highway Safety Design and Operations Guide (AASHTO), Road Design Manual(MDT), Traffic Engineering Manual(MDT), Manual on Uniform Traffic Control Devices (FHWA), Roadside Design Guide (AASHTO), A Policy on Geometric Design of Highways and Streets (AASHTO), ad-hoc AASHTO publications, NCHRP, FHWA, NHTSA, MDT reports and ITE publications. Montana Code Annotated , Uniform Vehicle Code.

MDT = Montana Department of Transportation
FHWA = Federal Highway Administration
AASHTO = American Association of State Highway Transportation Officials
NCHRP = National Cooperative Highway Research program
ITE = Institute of Transportation Engineers
NHTSA = National Highway Traffic Safety Administration

5. The following duties and/or specific tasks listed under 1 above are considered "essential functions" because they require specialized expertise and skill and are the primary reasons the job exists (they must be performed by this position with or without accommodations):

- Develop the Highway Safety Improvement Program applying expertise in transportation safety engineering covering a diversity of disciplines such as highway design, traffic engineering, intelligent transportation systems, statistics,

computer applications and basic economics. The safety goal is to reduce the severity and number of traffic accidents.

- Conduct safety reviews and corridor safety audits making safety recommendations to assist designers, decision makers in improving the safety on Montana highways.
- Train, mentor, coach and supervise the work of other engineers, design technicians and rotational engineers.
- Make presentations and represent the Safety Management Sections at meetings, field reviews. Contribute knowledge and safety expertise on research teams and ad hoc committees.
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The following mental and physical demands are associated with these essential functions:

PHYSICAL

- Office work with periods of extensive field work and occasional travel to meetings with citizens, local officials, consultants, project scoping teams with occasional overnight stays. Travel and surveys occasionally under bad weather, poor roadway conditions.

MENTAL

- Strong mental capabilities and ability to perform work under tight schedules and stressful situations. Attend meetings with advocacy and/or confrontational groups. Ability to prioritize work due to multitude of sites, corridors and safety reviews. Flexibility to address rush work assignments. Stress with legal depositions.

6. Does this position supervise others? **x Yes** ☐ **No**

Number directly supervised: Design technicians (2), rotational engineers (yearly number varies)
Complexity level of the positions supervised: Band 4, 5 and 6
Position Number(s) of those supervised: 08014, 36110

7. This position is responsible for:

☐ Hiring ☐ Recommends Termination **X** Supervision ☐ Pay Level
X Performance Management ☐ Promotions **X** Discipline
X Other: training, mentoring

8. Attach an Organizational Chart.

SECTION III - Minimum Qualifications - List minimum requirements for the first day of work.

Critical knowledge and skills required for this position:

KNOWLEDGE:
A thorough knowledge of the principles, methods and theories of Highway Safety Engineering, Highway Design, Highway Construction, Traffic Engineering. Extensive knowledge of highway

safety practices and keep current with latest technology, equipment and methods. Knowledge of Intelligent Transportation Systems. Ability to perform in depth engineering analyses and studies, to make engineering judgmental decisions based on the diverse knowledge of various disciplines and the unique site characteristics considering the economics of the recommendations and implications. Read, interpret and analyze engineering reports, accident investigator's reports, plans, designs and specifications. Ability to use computer programs, to extract and evaluate data and information for use in engineering decisions.

SKILLS:
Computer applications; Oracle, Excel, Word, PLSQL, Intersection Magic
Use of field equipment such as the DMI Distance Measuring Instrument, Ball Bank Indicator to measure the lateral acceleration on a curve.
Ability to establish and maintain effective working relationships with employees, citizens, groups, consultants, Federal, State and Local agencies. Must be able to communicate effectively both in writing and verbally.
Demonstrate skills in training, monitoring, coaching personnel in assigning tasks and reviewing work of others.
Must have a valid Montana driver's license.

Behaviors required to perform these duties:

Job specific behaviors:

- Creative problem solving: show extensive knowledge of safety countermeasures, new technology, innovative methods and, after sound PCI analyses (pros, cons and points of interest), apply to Montana highways
- Decision making: consider and evaluate alternatives and base decisions on sound engineering and on outcomes providing the highest return on the funds invested in the project.
- Organizational skills: ability to fully document processes and decisions. Set priorities on the numerous tasks to be carried out by this position.
- Interpersonal skills: build and maintain constructive and effective relationships with other Bureaus, Districts, Tribal contacts, local government representatives, enforcement agencies, the media and the public.
- Professionalism: is honest, caring and considerate of others. Follows the golden rule. Accepts personal responsibility for work and actions taken. Respects others.
- Leadership and mentoring: excels in helping, teaching, coaching and mentoring others. Leads the organization for the development of the Highway Safety Improvement Program.
- Adaptability and Flexibility: responds well to new assignments and to rush jobs.

MDT core behaviors:

Education:
Check the one box indicating minimum education requirements for this position for a new employee the first day of work:

☐ No education required	☐ Related AAS/2-years college/vocational training
☐ High school diploma or equivalent	**x** Related Bachelor's Degree
☐ 1-year related college/voc. training	☐ Related Master's degree

Please specify the acceptable and related fields of study:

Required/Acceptable: Civil Engineering

Related: Civil Engineering Technology, Construction Engineering Technology

Other education, training, certification, or licensing required (specify):
Requires Professional Engineer with Montana certification or PE from another State with certification in Montana within six months. The work requires proficiency and specialized training in MicroStation, computer aided drafting design, use of ORACLE data bases in conjunction with Query Builer, PL/SQL and other specialized software.

Experience:

Check the one box indicating minimum work-related experience requirements for this position for a new employee the first day of work:

☐ No prior experience required	☐ 3 years
☐ 1 year	☐ 4 years
☐ 2 years	***x*** 5 or more years

Other specific experience (optional):
Highway design, highway construction, traffic engineering

Alternative Qualifications:
This agency will accept alternative methods of obtaining necessary qualifications.

x Yes ☐ No

Alternative qualifications include:
Master of Science in Civil Engineering will substitute for one year of experience.
Individuals who are not P.E. certified may be eligible if they possess appropriate alternative qualifications based upon experience and education.

SECTION IV – Other Important Job Information

SECTION V – Signatures

Signature indicates this statement is accurate and complete.

Employee:

Name: _____ Title: _____

Signature: _____ Date: _____

Immediate Supervisor:

Name: _____ Title: _____

Signature: _____ Date: _____

Division/District Administrator:

Name: _____ Title: _____

Signature: _____ Date: _____

Department Designee:

Jennifer Jensen Administrator, Human Resources Division

Signature: _____ Date: _____